

THE GENERA OF FLIES IN THE SUBFAMILY BOTANOBIINÆ WITH HIND TIBIAL SPUR.

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In this paper is given a revision of the species in the genera *Hippelates* Loew, *Pseudohippelates* and *Prohippelates*, new genera, and *Ceratobarys* Coquillett. To anyone who has collected in the Southern States, and, in fact, almost anywhere in this country, many of the species of this group must be quite familiar, from their habit of settling on the hands and face. They prove a considerable annoyance in particular on warm days, evidently attracted to anyone who perspires at all freely. There is a belief, however well founded, that they are to a certain extent responsible for the transmission of "pinkeye" in the South. As indicated in the title the species have all a distinct hind tibial spur, by means of which they may be separated from all other Chloropidæ.

SYNOPTIC TABLE OF GENERA.

1. Frons with distinct orbital bristles.....	2
Frons with only hairs on orbits.....	3
2. Scutellum elongated, disk flattened; proboscis in male with two long hairs.	
<i>Prohippelates</i> , new genus.	
Scutellum rounded, convex; proboscis of male normal.	
<i>Pseudohippelates</i> , new genus.	
3. Arista flattened, straplike.....	<i>Ceratobarys</i> Coquillett.
Arista normal, not flattened.....	<i>Hippelates</i> Loew.

TABLE OF SPECIES IN HIPPELATES.

1. Mesonotum entirely glossy black, without any indications of dusting; legs entirely yellow.....	2
Mesonotum otherwise colored, yellow, brown, or brown-black; if black then with distinct dusting on disk, or if glossy black the legs with black or brown marks..	7
2. Anterior half of frontal triangle yellow, posterior half glossy black.	
1. <i>partitus</i> Becker.	
Frontal triangle either all black, or with only the margins, anteriorly, yellow, never with the anterior portion transversely divided in color from posterior portion.....	3

3. Mesonotum with discal hairs arranged in regular longitudinal rows of three to five..... 4  
 Mesonotum with discal hairs indiscriminately arranged, or in more than five rows. (These rows are considered as including the two lateral, generally punctate, rows and that space between them, but not the space beyond these rows laterally.)..... 5
4. The space between the center and lateral rows of discal hairs bare except for 3-4 weak hairs on anterior half of mesonotum; frontal triangle barely extending midway to anterior margin of frons, almost entirely bare; arista bare; scutellum with apical bristles yellow, approximated..... 2. *nudifrons*, new species.  
 The space between the central and lateral rows of hairs on disk occupied on its entire length by a regular series of short hairs; frontal triangle extending to almost the anterior margin of frons, its sides convex; third antennal joint blackened on dorsal surface; arista with short pubescence; apical bristles on scutellum not closely approximated..... 3. *nitidifrons*, new species.
5. Frontal triangle brownish yellow, only black on center, sides concave; head otherwise yellow; hind tibial spur about as long as diameter of tibia.  
 4. *peruanus* Becker.  
 Frontal triangle black, its sides straight; head not otherwise entirely yellow; hind tibial spur distinctly longer than diameter of tibia..... 6
6. Cheeks, except anterior margin narrowly, black; base of abdomen yellow; mid and hind coxæ generally darkened..... 5. *flavipes* Loew.  
 Cheeks, except posterior margin narrowly, yellow; abdomen with three longitudinal rows of black spots; mid and hind coxæ yellow.  
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7. Mesonotum glossy black; legs mostly pale yellow, the tibiæ for the greater part of that color, with generally only a more or less distinct brown, or black, band on hind pair..... 8  
 Mesonotum, if glossy black, obscured by brown or whitish dusting; or legs mostly brownish or black; or mesonotum brownish, or yellow, with or without dusting or markings..... 11
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 Scutellum concolorous with mesonotum..... 9
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 Third antennal joint generally distinctly darkened above; arista shorter than breadth of frons; scutellum rounded behind..... 10
10. Hind femora and hind tibiæ blackened on apical half.. 8. *apicata*, new species.  
 All femora more or less blackened or browned on middle.  
*flavipes*, var. *pusio* Loew.
11. Mesonotum entirely black, with more or less distinct grayish dusting..... 12  
 Mesonotum yellow, or reddish, with or without dusting or markings..... 21
12. Legs mostly black; mesonotum slightly dusted..... 13  
 Legs almost entirely yellow; mesonotum thickly dusted..... 18
13. Frons with lateral hairs in form of bristles..... 13a  
 Frons with only hairs on lateral margins..... 14
- 13a. Triangle dusted, opaque..... *capax*<sup>1</sup> Coquillett.  
 Triangle highly polished..... *gracilis*, new species.
14. Third antennal joint yellow or reddish below..... 15  
 Third antennal joint entirely black..... 16

<sup>1</sup>This species and *gracilis* I have put in a separate genus—*Pseudohippelates*—but included them here for convenience.

15. Fore coxæ yellow..... 9. *convexus* Loew.  
Fore coxæ black..... 10. *nigricoxa*, new species.
16. Mesonotum with 3 glossy black stripes on pollinose ground.  
..... 11. *subvittata*, new species.  
Mesonotum without glossy stripes..... 16a
- 16a. Third antennal joint above normal size, arista haired, cheeks not more than one-half as high as third antennal joint..... 12. *texana*, new species.  
Third joint about the usual size and about equal to cheek.  
..... 13. *microcentris* Coquillett.
17. Frontal triangle black, with gray dusting except on a spot below front ocellus and one on each side of posterior ocelli..... 19
18. Frontal triangle without any glossy black spots, entirely gray dusted.  
..... 14. *plebejus* Loew.
19. Proboscis elongated; tibial thorn situated slightly in front of tip.  
..... 15. *proboscideus* Williston.  
Proboscis normal; tibial thorn situated at apex of tibia..... 16. *nobilis* Loew.
20. Mesonotum with disk broadly brownish or blackish, gray dusted, humeri and pleuræ as well as hind margin, or whole, of scutellum yellow.  
..... 17. *dorsatus* Williston.
21. Mesonotum reddish, brownish, or yellow, unstriped..... 22  
Mesonotum yellow with distinct stripes..... 26
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23. Mesonotum yellow, frontal triangle black..... 19. *equalis* Williston.  
Mesonotum yellow, frontal triangle yellow..... 24
24. Scutellum with posterior margin truncate..... 25  
Scutellum with posterior margin rounded..... 20. *flavidula*, new species.
25. Larger species, 2-3 mm.; arista distinctly pubescent; scutellum flattened, sub-triangular, the apical margin truncate, apical marginal bristles long, cruciate.....  
..... *pallidus*<sup>1</sup> Loew.  
Smaller species, 1.5 mm.; arista pubescent; scutellum shorter than broad, sides slightly convergent posteriorly, width at apex equal to length; apical bristles cruciate..... 21. *subæqualis*, new species.
26. Mesonotum with three impressed lines generally more or less distinguished by blackish stripes, which are very narrow..... 22. *impressus* Becker.  
Mesonotum with distinct, broad stripes..... 27
27. The stripes black on their entire length..... 23. *dorsalis* Loew.  
Only the extremities of the stripes black, the remainder brownish yellow.  
..... 24. *stramineus* Loew.

## GROUP A.

## Species with Mesonotum Glossy Black, without Dusting; Legs Entirely Yellow.

## 1. HIPPELATES PARTITUS Becker.

Figs. 1, 2.

*Hippelates partitus* BECKER, Ann. Mus. Nat. Hung., vol. 10, 1912, p. 89.

*Female*.—Glossy black; pale yellow on anterior half of frontal triangle, whole of head except occiput, posterior half of frontal triangle and frontal stripe on posterior half, entire legs, and halteres. Venter

<sup>1</sup> This species is put in a new genus, *Prohippelates*, but is included here for convenience.

of abdomen yellowish or brownish, basal two segments dorsally yellowish. Hairs and bristles on body yellow; tibial spur black.

Frontal triangle elongate, occupying almost the entire width of frons at vertex, and extending almost to the extreme anterior margin of frons; sides straight, apex acute; surface hairs on frons pale, sparse; those on triangle forming a marginal line; antennæ of moderate size; arista bare, darkened on apical portion, barely as long as breadth of frons; proboscis fleshy, apical portion bent back under basal, but not as long as that part; cheeks glossy, about as high as third antennal joint; eyes bare, slightly higher than long. Mesonotum with lateral rows of hairs double from in front of middle, the center row single, the row between the center and lateral rows complete from anterior to posterior margins; surface of mesonotum very obscurely granulose; disk of scutellum distinctly granulose; apical marginal pair of bristles cruciate, approximated at base, their bases inserted in very slight tubercles, other marginal hairs weak, only one pair, in addition to the apical pair, noticeable. Hind tibial spur situated distinctly in front of apex of tibia, and about equal in length to tibial diameter. Wings clear, veins yellowish, third costal division slightly over one-half as long as second; veins 3-4 slightly divergent; outer cross vein slightly oblique, last portion of fifth vein  $1\frac{1}{2}$  times as long as penultimate section of fourth.

Length, 1-1.5 mm.

Described by Becker from Alabama (Aldrich). Specimens in collection from Dallas, Texas, March 15, 1907, "on wild plum" (F. C. Bishopp), three specimens; Plummers Island, Maryland, May 25, 1912 (H. S. Barber), 1 specimen; Rosslyn, Virginia, September 2, 1912 (R. C. Shannon), 1 specimen.

Nothing is known of the early stages of this species, and, from the above data, there are evidently several generations in the year.

## 2. HIPPELATES NUDIFRONS, new species.

Figs. 5, 8.

*Female*.—Glossy black; head except frontal triangle and occiput, base of abdomen, legs and halteres reddish yellow. Wings clear, veins yellow. Bristles and hairs on thorax and abdomen yellow. Tibial spur black.

Frontal triangle occupying almost the entire width of frons at vertex, forming an equilateral triangle, its sides straight, apex about two-thirds the distance to anterior margin of frons; width of front a little more than that of either eye, its surface almost entirely bare; antennæ slightly under the normal size, third joint disklike; arista bare, not as long as width of frons; cheeks rather higher than width of third antennal joint; palpi normal; proboscis entirely yellow, geniculated but not thin, the end portion slightly shorter than basal; eyes

bare, slightly longer than high. Mesonotum with the hairs in three single rows anteriorly, those on outer rows double on posterior half, the disk is otherwise bare, except for sometimes 2-3 weak hairs between the rows anteriorly; surface of both mesonotum and scutellum finely granulose; scutellum with disk slightly flattened and almost bare; the apical pair of bristles are very closely approximated, the bases set in very minute tubercles, other marginal hairs short. Basal two segments and apex of last segment of abdomen yellowish. Hind tibial spur longer than diameter of tibia, situated close to apex. Wings with third costal section one-half as long as second; outer cross vein slightly oblique; last section of fifth vein slightly longer than penultimate section of fourth; veins 2-3 straight; 3-4 very slightly divergent at apices.

Length, 1.5-2 mm.

*Type*.—Cat. No. 15959, U.S.N.M.

*Type-locality*.—Frontera, Tabasco, Mexico (C. H. T. Townsend).

*Paratypes*.—Frontera, Tabasco, Mexico (C. H. T. Townsend); Vieques Island, Porto Rico, February, 1899 (A. Busck).

### 3. HIPPELATES NITIDIFRONS, new species.

Figs. 35, 36,

*Female*.—Glossy black; anterior margin of frons, face, antennæ except upper half of third joint, base and venter of abdomen, and legs yellow. Wings clear, veins except costa and first vein colorless. Bristles and hairs on thorax and abdomen brownish yellow; tibial spur black.

Frontal triangle elongate, reaching to almost the anterior margin of frons, occupying almost the entire width of vertex, about one-third longer than broad, its sides slightly convex; margins of triangle and surface of frontal stripe with pale hairs; sides of frons slightly divergent anteriorly, its breadth at center almost one-third more than that of either eye; eyes bare, distinctly, but not greatly, higher than long; antennæ rather small, third joint rounded; arista slightly pubescent, about equal in length to breadth of frons; cheeks equal in height to third antennal joint; proboscis rather shorter, and more fleshy, than that of preceding species. Lateral rows of hairs on mesonotum double from near anterior extremity, the hairs between them carried well back toward scutellum; mesonotum finely, scutellum coarsely granulose; apical scutellar bristles not so closely approximated as in *nudifrons* and the bases not set in such distinct tubercles. Tibial spur longer than diameter of tibia and set well up from apex. Wings with venation similar to *nudifrons*.

Length, 1.5-2 mm.

*Type*.—Cat. No. 15960, U.S.N.M.

*Type-locality*.—Jacksons Island, Maryland (H. S. Barber).

*Paratypes*.—Washington, District of Columbia, August 17, 1912 (R. C. Shannon); East Florida (W. H. Ashmead); Franconia, New Hampshire (Mrs. A. T. Slosson); Ile de Montreal, Canada (Beaulieu); Dallas, Texas, "on wounded horse," September 27, 1909 (H. Pinkus); Medina, Ohio; Caldwell, New Jersey, July 16, 1887, "on cows" (M. S. Crane); Riverton, New Jersey; and specimens without data as to locality bearing numbers 5115 "annoying dogs, D. C. (?) July 6, '91," and 4487, "annoying cattle."

4. *HIPPELATES PERUANUS* Becker.

*Hippelates peruanus* BECKER, *Ann. Mus. Nat. Hung.*, vol. 10, 1912, p. 170.

*Female*.—Glossy black; frontal triangle glossy yellow, with a brown mark in center and on either side, the centers of which are black; head reddish yellow, occiput black, third antennal joint sometimes brown above; proboscis brown at apex; base, apex, and venter of abdomen yellowish; legs yellow, the apical tarsal joint sometimes brownish; halteres yellow. Wings clear, veins yellow. Bristles and hairs of body yellow, hind tibial spur black.

Frons rather narrow, but slightly more than equal to the width of either eye; triangle occupying almost the entire width of frons at vertex and extending about two-thirds to anterior margin; surface hairs weak, pale, those on triangle forming a marginal line; sides of triangle straight or very slightly concave, this latter appearance is heightened by the yellow margins; antennæ of moderate size; arista short, barely as long as breadth of frons, pubescent; cheeks as high as breadth of third antennal joint; eyes bare, almost round. Mesonotum with punctures at base of each of the surface hairs, those of the two lateral rows rather deep and forming rather distinct furrows, the hairs between the central and lateral rows irregularly arranged and generally 2-3 in number; scutellum with surface sparsely, pale haired, in outline not regularly rounded, the bases of the apical pair of cruciate, moderately approximated bristles set in short tubercles as are also the two much shorter lateral bristles. Hind tibial spur at half its own length in front of apex of tibia and in length equal to the tibial diameter. Wings rather narrow, third costal division equal to two-thirds the length of second; outer cross vein rather obliquely placed; last section of fifth vein about one-third longer than penultimate section of fourth.

Length, 1.5-2 mm.

Described from Peru and also recorded from Paraguay and Argentina by Becker.

I have specimens described above, which I consider are *peruanus* from the following localities: San Bernardino, Paraguay (K. Friebbrig); San Antonio, de la Banos, Cuba; and Fajardo, Porto Rico, February, 1899 (Busck).

The Cuban specimen differs slightly from the one from Porto Rico, but I do not consider it sufficient to warrant me in describing it as distinct.

5. HIPPELATES FLAVIPES Loew.

Figs. 3, 4.

*Hippelates flavipes* LOEW, Dipt. Amer. Sept. Ind. Cent., 6, 1865, species 95.

*Hippelates pusio* LOEW, Dipt. Amer. Sept. Ind. Cent., 10, 1872, species 87.

*Oscinis pallipes* LOEW, Dipt. Amer. Sept. Ind. Cent., 3, 1863, species 69.

*Hippelates splendens* ADAMS, Kansas Univ. Sci. Bull., 2, No. 14, 1904, p. 453.

*Hippelates bicolor* COQUILLET, Journ. N. J. Ent. Soc., vol. 6, 1898, p. 48.

*Hippelates calcaratus* ENDERLEIN, Sitzber. Ges. naturf. Frunde, Berlin, No. 4 (1911).

*Male and female*.—Colored as last species, but as a rule the anterior margin of frons is only narrowly yellow, and the third antennal joint is distinctly darkened above.

Frons occupying rather more than one-third the width of head; frontal triangle occupying almost entire width of frons at vertex, and reaching to almost the extreme anterior margin of frons, its sides straight, or slightly concave, hairs as in previous species; cheeks very rarely yellow in the type form, distinctly so in *bicolor*; eyes bare, slightly higher than long; antennæ of moderate size; arista slightly pubescent, as long as width of frons; proboscis glossy, black-brown, the apical portion bent back under the subapical almost as far as the length of that section. Mesonotum rather thickly covered with short hairs, the two lateral rows not easily distinguished except by the more distinct puncturation, the other hairs irregularly arranged, each with a shallow puncture at its base; the surface hairs and bristles are sometimes almost black, very rarely yellowish; scutellum with the apical pair of bristles cruciate, not closely approximated, the swelling at their bases very small. Abdomen generally yellow on basal two segments, but sometimes with three longitudinal rows of black spots (var. *bicolor*). Legs reddish yellow, the hind tibial spur situated well in front of apex of tibia, distinctly bent and much longer than diameter of tibia. Wings clear, veins yellowish; veins 3-4 subparallel; last section of fifth vein subequal with penultimate section of fourth, or slightly longer.

Length, 1.5-2 mm.

Described by Loew from Cuba. I have examined specimens in the U. S. National Museum collection from Dallas, Texas, September 19, 1911, "around horses" (F. C. Bishopp); Victoria, Texas, June 16; Hot Springs, Arkansas, June 25 (H. S. Barber); Crescent City, Florida, "Gnat, troublesome to eyes of animals"; Santa Rita, Mountains, Arizona, June 15 (Hubbard and Schwarz); East Point, Louisiana, October 7, 1907 (F. C. Bishopp); Batesburg, South Carolina, "in cotton blooms," September 30, 1911 (E. A. McGregor); Baracoa, Cuba, September (A. Busck); and one specimen with the

label "N. C." without other data. From the foregoing list it is evident that this species is both widely distributed and occurs both in early summer (June) and in the fall.

HIPPELATES FLAVIPIS, var. PUSIO Loew.

This variety differs from the type form in having the femora generally more or less blackened or browned and sometimes also the middle of hind tibia. In other respects it is as the type form, and I can see no reason for separating them as distinct species.

The localities of specimens in collection are Swansea, South Carolina, August, 1911 (F. Knab); Lake Worth, Florida (Mrs. A. T. Slosson); Biscayne Bay, Florida (Mrs. A. T. Slosson); Corpus Christi, Texas, July 21 (H. P. Wood); Victoria, Texas, "on horse," June 15 (J. D. Mitchell); Dallas, Texas, September 19, 1911 (F. C. Bishopp); Sharpsburg, Texas, June 16; Maryland, collection Coquillett; Las Vegas, Hot Springs, Arizona, August 11 (H. S. Barber); Archer, Florida, May; Tampico, Mexico, October 11, 1906 (F. C. Bishopp); and one specimen from Ottawa, Canada (Beaulieu).

The type-specimen of *bicolor* Coquillett came from Lake Worth, Florida, and in the same lot is a typical specimen of *pusio*. I have seen specimens from Texas that agree in color with the form described by Coquillett, and consider there is no ground for their separation from *flavipes*.

The variety *pusio* seems to have much the same range as *flavipes* and fills up some of the blanks in the occurrence of the type form (July-August).

With the single exception of *bicolor* the synonymy given herewith is that given by Becker in his paper on the group, and I can see no reason to doubt its correctness.

Williston records a supposed variety of *flavipes*<sup>1</sup> in a note as having the legs almost entirely black, except the tarsi, and the antennæ wholly black. I should be inclined to doubt this identification, though it is not an impossibility.

GROUP B.

Species with Mesonotum Glossy Black, without Dusting; Legs Partly Black.

6. HIPPELATES SCUTELLARIS Williston.

*Hippelates scutellaris* WILLISTON, Trans. Ent. Soc. Lond., 1896, p. 420.

*Male*.—Front yellow, including the lower part of the very large shining black triangle, which reaches very nearly to the base of the antennæ. Antennæ reddish yellow; the arista black and very finely pubescent. Eyes sparsely, but not distinctly, pubescent. Face yellow, somewhat blackish in the middle. Cheeks very narrow. Palpi yellow. Mesonotum wholly shining black, not pollinose. Scutellum reddish, blackish at the base, its straight distal margin with two rather remote bristles.

<sup>1</sup> Trans. Ent. Soc. Lond., 1896, p. 420.



Pleuræ reddish yellow. Abdomen elongate; shining black, at its base obscurely reddish. Legs yellow, the hind tibiæ somewhat and the last two joints of the tarsi brown. Wings nearly hyaline; third section of the costa as long as the second section.

Length, 2¼ mm.

One specimen. St. Vincent.

I have not seen this species, which, if it is a *Hippelates*, must be a very distinct one. Becker says "Aus Kuba, St. Vincent" (coll. Williston), but as he does not indicate in his paper that he has seen specimens I infer that he has made a geographical error. The description reads very like that of a *Siphonella* or *Botanobia* species.

7. HIPPELATES TRUNCATA, new species.

Figs. 7, 9, 10.

*Female*.—Glossy black; frons opaque, except triangle, sometimes brownish anteriorly, proboscis and palpi black or brown, antennæ yellow; arista brown; base of abdomen generally yellowish, and apex sometimes pale yellowish brown. Legs yellow; femora except bases and apices black, glossy; tips of tarsi brown. Wings generally slightly browned; veins brown. Halteres clear yellow. Hairs and bristles black or brown.

Frons about one-third wider than either eye, slightly longer than broad, triangle glossy, elongate, at its upper margin occupying nearly the entire vertex, extending to anterior margin of frons, sides straight, margin with a row of hairs situated in slight punctures; frontal stripe opaque, very indistinctly haired; antennæ of moderate size, third joint rounded, and covered with short pubescence; arista distinctly longer than breadth of frons, and with sparse, but distinct, pubescence; cheeks very narrow, almost linear; a short bristle at anterior angle, the marginal bristles short, but distinct; eyes about 1½ times higher than greatest length, bare; proboscis short; palpi of normal size. Mesonotum with the disk covered with irregularly arranged hairs, each of which is situated in a shallow puncture, the lateral rows almost indistinguishable; scutellum flat, distinctly broader at base than long, sides converging posteriorly, posterior margin truncate, at each angle posteriorly there is a small, but distinct, tubercle, on each of which is situated a long bristle, the other marginal hairs short. Legs with hind femora slightly incrassated and a little bent, hind tibiæ with the apical spur twice as long as tibial diameter, strongly curved, and situated at apex. Wings with second and third costal divisions subequal; veins 2-3 curved up at extreme apices; veins 3-4 divergent, the latter almost straight and ending in wing tip; last section of fifth vein slightly longer than penultimate section of fourth; surface of wing with the microscopic hairs unusually distinct.

Length, 1.5-2 mm.

*Type*.—Cat. No. 15961, U.S.N.M.

*Locality of type.*—Cacao, Trece Aguas, Alta v. Paz, Guatemala, April 25 (Schwarz and Barber).

*Paratypes.*—One specimen same data as type; one specimen, Motzoropago, Vera Cruz, Mexico, February 11, 1892 (H. Osborn); and one specimen, San Rafael, Vera Cruz, Mexico, March 14 (C. H. T. Townsend).

8. HIPPELATES APICATA, new species.

Fig. 6.

*Female.*—Glossy black; head yellow except triangle and occiput, which are glossy black, and the upper half of frons which is blackened; third antennal joint browned above, or entirely yellow, arista brown; lower margin of cheeks narrowly brown; proboscis browned. Abdomen yellowish at base, apex, and ventrally. Legs yellow, apical half of hind femora and tibiæ black, last two tarsal joints on all legs black. Wings clear, veins yellow, costal vein brown. Halteres whitish yellow. All hairs and bristles on body yellowish. Hind tibial spur black, glossy.

Frons a little over one-third the width of head; triangle occupying almost entire width of vertex, reaching to four-fifths the distance to anterior margin, sides straight, apex acute, its entire length exceeding its greatest width, neither the marginal hairs nor punctures very distinct; surface hairs on frons sparse; cheeks as broad as third antennal joint, or slightly broader, marginal hairs weak; eyes about one-third higher than long, bare; proboscis geniculated, its apical portion almost as long as preceding portion, glossy, chitinised, but not slender; antennæ rather under the average size; arista short, not equal in length to width of frons, very shortly pubescent. Mesonotum with the hairs rather long, irregularly arranged posteriorly, but on the anterior half the lines are traceable, each hair situated in a distinct puncture, the outer rows most distinct, double; scutellum with disk granulose, the apical pair of bristles long, cruciate, the tubercles at base small, and not closely approximated. In some cases (probably immature specimens) the abdomen is almost entirely yellow with a black lateral spot on sides of third and a black fore marginal band on apical two segments. Hind tibial spur strongly bent; situated well in front of apex of tibia and distinctly more than twice as long as tibial diameter. Wings with third costal division one-half as long as second; veins 3-4 parallel, the latter ending just behind wing tip; outer cross vein oblique; last section of fifth vein slightly longer than penultimate section of fourth.

Length, 1.5-2 mm.

*Type.*—Cat. No. 15962, U.S.N.M.

*Type-locality.*—Mayaguez, Porto Rico, January, 1899 (A. Busck).

*Paratypes*.—One specimen, Vieques Island, Porto Rico (C. W. Richmond); one specimen, Habana, Cuba (S. Fernandez); and one specimen, Andros Key, Bahamas, August 1, 1904 (no collector's name).

#### GROUP C.

Species with Mesonotum Black, Covered with more or less Distinct Dusting; Legs Mostly Black with Yellow Markings.

##### 9. HIPPELATES CONVEXUS Loew.

*Hippelates convexus* LOEW, Dipt. Amer. Sept. Ind. Cent., 6, 1865, species 94.

*Male and female*.—Glossy black, the color of mesonotum slightly obscured by gray pollinosity; frontal triangle highly glossy; frons yellow, darkened posteriorly; face and cheeks yellow; antennæ brown, third joint largely yellow below, and particularly so on inner side; proboscis brown; palpi pale yellow. Upper portions of pleuræ and lateral margins of mesonotum with gray pollen. Abdomen yellowish at base and ventrally. Legs yellow, mid and hind coxæ browned; mid and hind femora blackened; fore tibiæ sometimes browned at apex, mid tibiæ at middle and most of hind tibiæ as well as apices of all tarsi broadly black or brown. Wings grayish, veins brown. Halteres yellow. Bristles and hairs black or brown.

Frons occupying slightly over one-third the width of head; triangle almost touching margins of eyes at vertex, extending three-fourths to anterior margin of frons, its sides slightly convex; surface of frontal stripe and margins of triangle with sparse, but distinct, hairs; antennæ of rather above the average size, third joint rounded, or slightly truncate, at apex; arista pubescent, base swollen and the two basal joints slightly elongated; cheek equal in height to slightly over one-half the width of third antennal joint; proboscis not noticeably elongated, the apical portion very short, though turned back; eyes almost round, bare. Mesonotum without any distinct lateral rows of hairs with punctures at their bases, all the hairs arranged in rows, but difficult to trace because of the absence of these punctures; scutellum rounded in outline, convex, surface with sparse hairs, the two apical bristles not approximated, and no tubercles at their bases, besides the two strong bristles there are two weaker bristles anterior to them. Legs of moderate strength; hind tibial spur short, equal in length to tibial diameter, situated near the apex. Wings with third costal division about one-half as long as second; veins 3-4 slightly divergent; outer cross vein slightly oblique; penultimate section of fourth vein distinctly shorter than last section of fifth.

Length, 1.25-1.75 mm.

Locality originally described from: Cuba.

Localities of specimens in collection: Baracoa, Cuba, August, 1901 (A. Busck); Aguadilla, Porto Rico, September, 1901 (A. Busck);

San Jose de Guaymas, Mexico, April 10 (L. O. Howard); Managua, Nicaragua (Baker); San Marcos, Nicaragua (Baker); Tampico, Mexico, December 6 (F. C. Bishopp); Montserrat, Trinidad (A. Busck); and two specimens that agree fairly well with the description from Dallas, Texas, one by E. S. Tucker, and the other by Jones and Hood.

Becker records it from Tifton, Georgia (Melander), but I can not reconcile his description with that of Loew. He records it also from Peru to Argentina in his paper on the Nearctic Chloropidæ (p. 172).

10. HIPPELATES NIGRICOXA, new species.

Figs. 12. 14.

*Female*.—Glossy black; frontal triangle glossy black, frontal stripe opaque black posteriorly, orange yellow on anterior half; face and cheeks yellow, the latter with a whitish bloom; antennæ with basal joints brown, third joint broadly black above, distinctly reddish yellow below, at least on inner surface; proboscis brown; palpi yellow. Mesonotum glossy on disk, the shining parts rarely stripe like, lateral and posterior margins, as well as scutellum and upper portions of pleuræ with distinct gray pollinosity. Abdomen sometimes yellowish at base, brownish ventrally. Legs black; fore and mid trochanters, bases and apices, narrowly, of fore and mid femora, rarely the apex of hind femur, bases of fore tibiæ, bases and apices of mid tibiæ broadly, and bases of hind tibiæ narrowly, as well as bases of posterior tarsi yellowish. Wings slightly grayish, veins black-brown. Halteres yellow. Hairs and bristles black or brown.

Frons slightly over one-third the width of head; triangle occupying all except a narrow space on each side at vertex, extending four-sevenths the frons length, sides slightly convex; surface hairs distinct, those on margins and in center in front of triangle noticeably so; antennæ above normal size, but somewhat variable in this respect; third joint not rounded, slightly truncate; arista barely longer than width of frons, basal joints elongated, and slightly swollen, pubescence loose and distinct; cheeks linear, eyes bare, distinctly higher than long; proboscis not elongated, apical portion fleshy, bent back about one-half the length of preceding portion. Mesonotum with two slight longitudinal depressions, occupying the lines usually followed by the lateral rows of hairs, the surface hairs rather irregularly arranged, but usually 3-5 between the lateral depressions; scutellum rounded in outline, the surface hairs not very numerous, but distinct, marginal hairs rather longer than normally, the apical bristles not approximated, cruciate. Legs covered with short pale hairs; the apical spur on hind tibia bent, situated slightly before apex of tibia and not exceeding in length the diameter of tibia. Wings with the third costal division one-half as long as second; veins 3-4 subparallel;

outer cross vein slightly oblique, penultimate section of fourth vein equal to three-fourths the length of last section of fifth.

Length, 1.5–2 mm.

*Type*.—Cat. No. 15963, U.S.N.M.

*Type-locality*.—Montserrat, Trinidad, British West Indies, June 27 (A. Busck).

*Paratypes*.—Same data, six specimens; and two specimens from St. Thomas, West Indies, August 2 (A. Busck), which I am unable to separate from the Trinidad specimens by any reliable specific characters.

11. HIPPELATES SUBVITTATA, new species.

Very similar to *texana*, but differing in having the yellow color of frons and other parts of the head, including palpi, much obscured, almost black in some specimens. The triangle is more elongate than in *texana*, cheeks about as high as third antennal joint; the mesonotum has the disk anteriorly glossy, with two pollinose gray lines intersecting it, as extensions of the prescutellar pollinose patch, thus giving it the appearance of having three glossy black stripes; the surface hairs on mesonotum are much longer and more numerous than in *texana*, and the pollinosity on margins of mesonotum and scutellum more distinct. In other particulars the two species are very similar.

*Type*.—Cat. No. 15964, U.S.N.M.

*Type-locality*.—Longview, Texas, March 26, 1908 (E. S. Tucker).

*Paratypes*.—Two specimens, same data as type; one, Mound, Louisiana, May 24, 1907 (F. C. Bishopp); one, Jefferson, Texas, March 27, 1908 (E. S. Tucker); one, Texarkana, Texas, March 28, 1908, on *Cornus* (E. S. Tucker); one, New Boston, Texas, June 5, 1909 (F. C. Bishopp); and two, Washington, District of Columbia, June 6, 1912 (W. L. McAtee).

12. HIPPELATES TEXANA, new species.

Figs. 11, 13.

*Female*.—Similar to *nigricoxa* but the yellow color is rather more extensive on the legs, and slightly paler; the antennæ are entirely black; and the mesonotum is entirely covered with more sparse pollen.

Frons as in *nigricoxa*; triangle with sides distinctly convex, the anterior angle not acute but rounded; surface hairs on frons sparse but distinct, though short; antennæ distinctly above the average size, third joint rounded on lower side at apex, the upper corner slightly acute, pilosity not more distinct than in other species; arista as in foregoing species; cheeks higher than in *nigricoxa*, at least one-half as high as width of third antennal joint; the anterior margin slightly produced, marginal bristles pale; upper mouth margin black;

proboscis as in *nigricoxa*; eyes bare, oval, but not with the longest axis upright, placed so that their greatest height and length are about equal. Mesonotum with two broad, shallow sulci, unpunctured; surface hairs as in *nigricoxa* but shorter and more sparse; scutellum broad and short, rounded in outline, the marginal bristles stronger than in *nigricoxa* in comparison also with the other hairs on scutellum. Legs with the pale surface hairs as in preceding species, the tibial spur similar to that species. Wings with venation as in *nigricoxa*.

Length, 1.5–2 mm.

*Type*.—Cat. No. 15965, U.S.N.M.

*Type-locality*.—Brownsville, Texas, July 16, 1906, "Reared from cotton squares." (No collector's name.)

*Paratypes*.—One specimen, Dallas, Texas, "From cotton squares," July 21, 1905 (W. W. Yothers); six specimens, Ruston, Louisiana (W. D. Pierce and H. S. Smith). I have also seen a large series reared from cotton squares, Calvert, Texas, 1902 (G. H. Harris), and specimens from the following localities: Victoria, Texas (J. D. Mitchell); Liberty, Texas (E. S. Tucker); Logansport, Louisiana (E. S. Tucker); and Tampico, Mexico (F. C. Bishopp).

### 13. HIPPELATES MICROCENTRUS Coquillett.

Fig. 20.

*Hippelates microcentrus* COQUILLET, Invertebrata Pacifica, Rep. Cal. and Nev. Dipt., vol. 1, 1904, p. 28.

*Female*.—Very similar in color to the preceding species, but the legs are very distinctly darker, the yellow color being confined to knee joints, bases and apices of mid tibiae, and bases of posterior two pairs of tarsi. The abdomen shows hardly any traces of yellow at the base. Halteres with yellow pedicel and white knob.

More elongate than either of the two preceding species. Frons occupying almost one-half the head width; triangle heart shaped, the posterior corners rounded, sides slightly convex, apex acute, occupying two-thirds the width of frons at vertex and extending slightly beyond middle of frons anteriorly; surface hairs regularly, but sparsely, arranged, the space in front of apex of triangle bare; antennae of similar shape to those of *texana* but rather smaller, the third joint with rather more distinct pilosity; arista as in *texana*, but less distinctly pubescent; cheeks with whitish pollen, equal to, or slightly higher than, width of third joint of antennae, proboscis as in *texana*. Mesonotum in all the specimens in type series in poor condition, due to pin, but evidently similar to *texana*; scutellum with four distinct bristles, the middle pair not approximated; upper portions of plurae pollinose, lower highly glossy. Legs slender, femora glossy; surface hairs pale; hind tibial spur curved, short,

equal to diameter of tibia. Wing with third costal division two-thirds as long as second; veins 3-4 parallel.

Length, 2-2.5 mm.

Redescribed from type. Locality, San Mateo County, California (Baker).

There is a single specimen in the U. S. National Museum collection from Motzorongo, Vera Cruz, Mexico, February, 1892 (H. Osborn), which differs slightly from the type, but not to such an extent that I consider it necessary to describe it as another species.

Becker records *microcentrus* from Bolivia.

#### GROUP D.

Species with Mesonotum Black, Thickly Gray, Dusted on Disk; Legs Almost Entirely Yellow.

#### 14. HIPPELATES PLEBEJUS Loew.

Figs. 15, 17.

*Hippelates plebejus* LOEW, Dipt. Amer. Sept. Ind. Cent., 3, 1863, species 68.

*Female*.—Black, slightly shining; frons yellow, triangle black, thickly gray dusted; antennæ yellow, third joint rarely darkened on upper surface; face and cheeks yellow; back of head black; proboscis black, glossy; palpi yellow. Mesonotum thickly covered with yellowish or grayish pollinosity; humeri, upper parts of pleuræ, and hind margin of scutellum generally yellow. Abdomen black with yellow hind margins to segments, yellow with black fore margins to segments, or yellow with three longitudinal rows of black spots. Legs entirely pale yellow. Wings clear; veins yellow. Halteres yellow. Bristles and hairs on body yellow; apical spur on hind tibia black.

Frons about one-third broader than either eye; triangle occupying almost entire width at vertex, forming an equilateral triangle, and extending to middle, or slightly beyond middle of frons; surface hairs on frons numerous, but not very distinct; anterior margin of frons slightly protruding; antennæ of moderate size, third joint rounded; arista not as long as width of frons, slightly pubescent; cheek about equal in height to breadth of third antennal joint, the anterior margin slightly produced; eyes bare, slightly higher than long. Mesonotum with three rather indistinct lines of shallow punctures, the disk with numerous, closely placed, short hairs; scutellum rounded in outline, the posterior margin with two long and two short bristles, the long ones not approximated at the base, disk with numerous short hairs. Surface hairs on abdomen short. Legs moderately stout; hind femora slightly thickened; hind tibial spur very long, and much bent, reaching to beyond middle of metatarsus, situated close to apex; hind metatarsus attenuated at base.

Wings with third costal division barely equal to one-half the length of second; veins 3-4 subparallel or sometimes slightly convergent; outer cross vein slightly oblique; last section of fifth vein and penultimate section of fourth subequal.

Length, 2-2.5 mm.

Originally described from District of Columbia. Sometimes the hind femur is slightly darkened on middle, and rarely the hind tibia.

I have seen specimens from: Columbus, Texas, August 15; Sharpshurg, Texas; Wades, Texas; San Diego, Texas; Brownsville, Texas; Beeville, Texas; Floresville, Texas; Maryland (collection Coquillett); Biscayne Bay, Florida (Mrs. A. T. Slosson).

15. HIPPELATES PROBOSCIDEUS Williston.

*Hippelates (Siphomyia) proboscideus* WILLISTON, Trans. Ent. Soc. Lond., 1896, p. 418.

This species answers in practically all particulars to the description given herewith for *plebejus* except in its possession of a small glossy black spot on the triangle in front of the anterior ocellus. In the description much importance is attached to the fact that the proboscis is elongated and geniculated, the apical portion being turned back for a distance a little shorter than the length of head. This is also the case in *nobilis* and *plebejus*. There is nothing in the description except the character above mentioned by means of which it may be separated from *plebejus*.

*Locality*.—St. Vincent, West Indies.

16. HIPPELATES NOBILIS Loew.

Figs. 18, 38.

*Hippelates nobilis* LOEW, Dipt. Amer. Sept. Ind. Cent., 3, 1863, species 67.

This species is very similar in most respects to *plebejus* Loew, but has the glossy spots on the frons more or less distinct, and the hind femora and tibiæ have a distinct black ring on middle. In a series of specimens from Duncan, Oklahoma, July, 1909 (T. D. Urbahns), the frons is much narrower; the triangle reaches short of middle of frons; the cheeks are comparatively higher, and their anterior margin more protruding; the scutellum is less broadly yellow, the abdomen consistently with fore marginal bands on all segments except the basal two; and the hind tibiæ have in all cases a very distinct middle band. The hind metatarsus also seems to be less distinctly attenuated at base.

I have examined one specimen in U. S. National Museum collection labeled "N. C." which differs from the series from Oklahoma in having no pale color on thorax, in having the abdomen with only narrow, hind marginal, yellow bands. In other respects as *nobilis*.



Without examination of more specimens I consider it unwise to give this form specific rank.

There are several specimens in same collection from Trinidad River, Panama, March 29, 1912 (A. Busck), which resemble the above specimen very closely, differing principally in size, being about 3 mm. as against 2 mm. Amongst these specimens there are some that represent different forms which are ranked as species at present and which cause me to have doubts as to the validity of these specific values. It is impossible, however, to say definitely whether the forms here listed are good species or only varieties without rearing them.

17. HIPPELATES DORSATUS Williston.

*Hippelates (Siphomyia) dorsatus* WILLISTON, Trans. Ent. Soc. Lond., 1896, p. 419.

This is merely a variety of *plebejus*, in which the yellow color of thorax is more than usually pronounced.

Described from St. Vincent, West Indies.

GROUP E.

Species with Mesonotum Yellow, or Reddish, Without Stripes.

18. HIPPELATES TENER Coquillett,

Fig. 30.

*Hippelates tener* COQUILLET, Proc. U. S. Nat. Mus., vol. 22, 1900, p. 265.

*Female*.—Reddish yellow, shining; frons pale yellow anteriorly, becoming brown toward vertex; triangle narrowly gray dusted on margins, more broadly at posterior lateral angles, and on ocellar region, glossy red brown in center; occiput grayish; third antennal joint browned above; proboscis brown. Disk of mesonotum sometimes brownish, always with distinct pollinosity; upper half of pleuræ gray pollinose, lower half glossy. Abdomen reddish brown, basal segments and apices of segments yellowish. Legs yellow, blackened on fore tarsi, slightly on mid and hind femora at middle, and distinctly on apices of hind tibiæ as well as mid and hind tarsi. Wings grayish, veins brown. Halteres yellow. Bristles and hairs black, or brownish.

Frons short and broad, occupying almost one-half the width of head; outline of triangle rather indistinct, but traceable almost to eye margin at vertex, rounded in front, and extending to over middle of frons; surface hairs distinct, antennæ rather above average size, third joint rounded, arista not as long as width of frons, pubescent; cheek not very high, about half as high as third joint of antenna, not produced anteriorly; proboscis short, thick, the apical portion turned back for a short distance; eyes bare, slightly higher than long. Mesonotum impunctate, but with two very faint sulci,

surface hairs not very distinct nor numerous; scutellum short and broad, outline rounded, marginal bristles four in number the apical pair strong, not approximated at base, the basal pair much weaker, hairlike. Legs normal; hind tibial spur short, about equal to tibial diameter, curved, and situated near to apex. Wings with third costal division over one-half as long as second; venation normal.

Length, 1-1.5 mm.

Described from type-specimens.

*Type-locality*.—Fajardo, Porto Rico, February, 1899 (A. Busck).

*Paratypes*.—Utuaado, Porto Rico, January, 1899 (A. Busck); Managua, Nicaragua (Baker); Tabogo Island, Panama, July, (A. Busck); and Cordoba, Vera Cruz, Mexico (Dr. A. Fenyés).

The specimen from Mexico has the dorsum of mesonotum almost black. It might be possible to place this single specimen by using Becker's table for the species in *Hippelates*, but the type form would be very difficult to locate in it.

#### 19. HIPPELATES EQUALIS Williston.

*Hippelates equalis* WILLISTON, Trans. Ent. Soc. Lond., 1896, p. 419.

*Male and female*.—Front broad, the very large shining black triangle extends to near the root of the antennæ; remainder of the front opaque black. Thorax light reddish yellow, the mesonotum shining. Scutellum flattened, subquadrate, the marginal bristles remote from each other on the angles. Abdomen reddish yellow, the distal segments somewhat obscure. Legs wholly light yellow; spur of the hind tibia long, curved and black. Wings grayish hyaline; second and third sections of the costa of nearly equal length.

Length, 2 mm.

Four specimens. St. Vincent. This species is related to *H. pallidus* Loew, but will be distinguished by the color of the front.

The above is a copy of Williston's description of *equalis*. The species is more closely allied to *subequalis* than to *pallidus*, but is evidently quite distinct. I have not seen this species.

#### 20. HIPPELATES FLAVIDULA, new species.

*Male*.—Pale, shining, reddish yellow; ocellar spot, a small spot on third antennal joint at insertion of arista, a spot on lower anterior portion of mesopleura, and abdomen brown black. Wings clear, veins brownish. Bristles and hairs on body black.

Frons slightly over one-third the width of head; triangle glossy, occupying over two-thirds the width of vertex, extending over halfway to anterior margin of frons, sides slightly convex, apex obtuse; frontal stripe opaque, surface hairs rather numerous, but short; antennæ of moderate size, third joint rounded in front; arista brown, distinctly longer than width of frons, pubescent; cheeks narrow, not over one-half as high as width of third joint of antenna; proboscis short, yellow. Mesonotum impunctate; hairs arranged in rows, but not very numerous nor distinct; scutellum convex, the

margin rounded; four bristles present, the basal two much shorter than the widely placed apical pair, disk with short hairs. Legs with pale, short, surface hairs; apical spur on hind tibia strong, bent, situated a little before apex of tibia and about one-half longer than tibial diameter. Wings with veins 2 and 3 bent up a little at their apices; third division of costa a little over two-thirds as long as second; veins 3 and 4 divergent, the latter straight, finishing just below apex of wing; outer cross vein oblique.

Length, 1.25 mm.

*Type*.—Cat. No. 15966, U.S.N.M.

*Type-locality*.—Montserrat, Trinidad, West Indies, June 29, 1905 (A. Busck). One specimen.

21. HIPPELATES SUBÆQUALIS, new species.

Fig. 29, 37.

*Female*.—Shining reddish yellow; triangle entirely yellow, or with the ocellar spot darkened; the thorax has a black spot low down in front where it is connected with the head, and the abdomen is brownish apically. Wings browned slightly; veins brownish yellow. Halteres yellow. Hairs yellow, bristles brownish yellow.

Frons occupying about one-half the width of head; triangle nearly as wide as vertex, and extending to anterior margin of frons; antennæ rather above average size, third joint rounded; arista distinctly pubescent, brown, and longer than width of frons; cheeks linear; eyes higher than long; proboscis short. Mesonotum narrowed anteriorly, impunctate, hairs irregularly arranged, scutellum subquadrate, the posterior margin sometimes concave in outline; apical bristles situated on posterior angles, cruciate, diskal hairs and other marginal bristles weak. Legs slender; hind tibial spur long, reaching to beyond middle of metatarsus, curved, its base at apex of tibia. Wings with third costal division equal in length to second; third and fourth veins slightly divergent.

Length, 1.25–1.75 mm.

*Type*.—Cat. No. 15967, U.S.N.M.

*Type-locality*.—Montserrat, Trinidad, West Indies, June 29, 1905 (A. Busck).

*Paratypes*.—Six specimens same data.

There is a single specimen from Tabernilla, Canal Zone, Panama, taken by the same collector, which agrees in most respects with the type, but has a black central streak on the triangle.

This species is very close to *equalis* Williston, but I believe it is distinct, though Williston's description is not very comprehensive.

## GROUP F.

## Species with Mesonotum Yellow with Distinct Stripes.

## 22. HIPPELATES IMPRESSUS Becker.

Fig. 16.

*Hippelates impressus* BECKER, Ann. Mus. Nat. Hung., vol. 10, 1912, p. 92.

*Female*.—Yellow, subshining. Ocellar spot and back of head blackened; disk of thorax reddish yellow, covered with grayish pollen, the three punctate lines generally darkened. Abdomen generally brown above, or with anterior marginal dark bands, which sometimes are tridentate or almost in three rows of spots. Hairs pale, bristles brownish.

Frons distinctly, but not greatly broader than either eye; triangle nearly the whole width of vertex, forming an almost equilateral triangle, its apex slightly beyond middle of frons, sides straight; surface hairs sparse, weak; antennæ normal in size and shape; arista with basal joints elongated and swollen, apical portion brown, pubescent, length of arista slightly more than equal to width of frons; cheeks rather less in height than the breadth of third antennal joint; eyes bare, distinctly higher than long; proboscis with apical portion slightly prolonged, bent backward. Mesonotum with the sulci distinct, each of these with a double row of hairs in it, and between them and the central, narrower, line there are 3 and 4 rows of short hairs; scutellum with rounded outline; apical pair of bristles slightly approximated, basal pair much weaker than apical pair. Legs normal, hind tibial spur situated close to apex of tibia, bent, not longer than diameter of tibia. Wings with third costal division one-half as long as second; veins 3 and 4 subparallel; outer cross vein slightly oblique.

Length, 1.25–1.75 mm.

Described originally from Santa Gertrudes, Texas, a stage station about 50 miles from Brownsville, by Becker. I have before me specimens from the same lot, taken by E. A. Schwarz, and specimens from San Diego, Texas; Beeville, Texas; Sharpsburg, Texas; Santa Rosa, Texas; Newcrest, Texas; and Bright Angel, Arizona (H. S. Barber). None of the Texan specimens except those taken by E. A. Schwarz have collector's names on them. There are also two specimens in U. S. National Museum collection from Filmore Canyon, Organ Mountains, New Mexico (C. H. T. Townsend). These latter were taken at a height of about 6,000 feet in August; the dates for the other specimens range from end of April to June in Texas, and July 10 in the case of the one from Arizona. The Arizona specimen bears a label: "Very annoying by lighting on face and hands while working."

## 23. HIPPELATES DORSALIS Loew.

Figs. 33, 34.

*Hippelates dorsalis* LOEW, Dipt. Amer. Sept. Ind. Cent., 8, 1869, species 75.

*Female*.—Yellow, subshining; ocellar spot, upper surface of third antennal joint and back of head blackened. Mesonotum with three broad subopaque black stripes, the side ones shortened slightly, the middle one very narrowly divided by a yellow line, and, usually, two elongate spots in front of wing bases; pleuræ with generally the lower half of meso- and sternopleuræ black; scutellum black at base. Abdomen with the anterior half of segments occupied by a black, posteriorly tridentate band. Legs yellow, rarely with the hind tibiæ and apices of tarsi brownish. Halteres yellow. Wings clear, veins yellow. Hairs yellow, bristles black.

Frons occupying a little more than one-third the width of head; triangle ill-defined, not shining; occupying more than two-thirds the width of vertex and very short, not extending to middle of frons; surface hairs weak; antennæ small, third joint rounded, pilose; arista tapering, almost bare, not as long as width of frons; cheeks higher at anterior than at posterior margin, and at lowest part at least as high as width of third antennal joint, projecting at anterior margin; proboscis glossy brown, rather long, geniculated, apical portion almost as long as subapical; eyes almost round. Mesonotum impunctate, rather thickly covered with short, pale hairs; scutellum rounded in outline, slightly convex, disk with short hairs, apical bristles stronger than the subapical pair, not closely approximated. Legs normal; hind tibial spur as in *impressus*. Wings with venation as in *impressus*.

Length, 1.5–2 mm.

Originally described from Cuba by Loew. Specimens in U. S. National Museum collection are from Biscayne Bay, Florida (Mrs. A. T. Slosson).

Becker had not seen this species and placed it in his table among the species with the disk of mesonotum black or gray. Thus it is impossible to place it by the use of his table.

## 24. HIPPELATES STRAMINEUS Loew.

Figs. 19, 25, 32.

*Hippelates stramineus* LOEW, Dipt. Amer. Sept. Ind. Cent., 10, 1872, species 90.  
*Oscinis ovalis* ADAMS, Ent. News, 1905, p. 110.

*Female*.—Pale yellow, subopaque. Ocellar spot, upper side of third antennal joint, and a spot on back of head black. Mesonotum with three reddish-yellow stripes, the middle one of which is divided, the side stripes are shortened in front and posteriorly, the middle one reaches the anterior margin but is much shorter posteriorly than the

lateral stripes; on the extremity of the middle stripe anteriorly there is a black spot while the lateral stripes are blackened at apices anteriorly and slightly on the small rounded portion behind humeri; there is also an elongate black spot in front of wing base; pleuræ with a glossy black spot on lower portion of the mesopleura and another more obscure one on above hind coxa; scutellum yellow, with rarely a blackened area on disk. Abdomen yellow, with either narrow, fore-marginal, tridentate black bands, or three longitudinal rows of spots. Legs with tarsi sometimes browned at apices. Wings clear, veins yellow. Halteres yellow. Hairs yellow, bristles black.

Frons occupying one-half the width of head; triangle poorly defined, nearly as wide posteriorly as vertex, and extending to distinctly beyond middle of frons, both triangle and frontal stripe opaque; lateral margins with the hairs setulose, becoming stronger toward posterior margin; frons slightly protruding in front; antennæ of moderate size, third joint rounded in front; arista tapering, nearly bare, shorter than width of frons; cheeks high, about twice as high as third joint of antennæ, and over half as high as the eye, which is small and almost round; proboscis not elongated. Mesonotum impunctate, the hairs short and rather irregular; between the prescutellar bristles there is a row of 4-6 setulæ; scutellum short but the outline not regularly rounded, the apex somewhat acute; bristles strong, the apical pair not much approximated. Legs normal; hind tibial spur shorter than diameter of tibia. Wings with veins 2-3 divergent; third costal division one-half as long as second; veins 3-4 subparallel.

Length, 2 mm.

Described from Tifton, Georgia.

Represented in U. S. National Museum by specimens from Clarendon, Texas, July 31, 1909 (V. I. Safro); Victoria, Texas (J. D. Mitchell); Plano, Texas, July, "in cornfield" (E. S. Tucker); Mesilla Park, New Mexico (C. N. Ainslie).

#### PROHIPPELATES, new genus.

This genus is distinguished from *Hippelates* by the presence of orbital bristles and from *Pseudohippelates* by the presence of the two long hairs on proboscis in male and the flattened scutellum.

*Type of this genus.*—*Hippelates pallidus* Loew.

#### PROHIPPELATES PALLIDUS Loew.

Figs. 21-24.

*Hippelates pallidus* LOEW, Dipt. Amer. Sept. Ind. Cent., 6, 1865, species 93.

*Female.*—Pale yellow, shining; ocellar spot, and sometimes apex of abdomen, blackened; arista black, or brown. Mesonotum occasionally with indications of a reddish stripe on either side, but usually only

the disk rather more inclined to reddish yellow than the pleuræ. Hairs and bristles on body yellow, those bristles on posterior part of mesonotum and scutellum black. Apical tibial spur glossy black. Wings clear, veins brownish yellow.

Frons distinctly, but not greatly, over one-third as wide as head; triangle large, occupying almost the entire vertex, and extending nearly to anterior margin; lateral frontal hairs strong, four along eye margin being bristlelike, the whole four directed backward, the lower two slightly outward; antennæ large, third joint rounded; arista not longer than width of frons, very distinctly pubescent; cheeks very narrow, not equal to more than one-third as high as width of third antennal joint; a distinct bristle at anterior margin; proboscis geniculated, but thick and fleshy; palpi large, hairy; eyes bare or slightly pilose, much higher than long. Mesonotum with the surface hairs very numerous, and irregularly arranged; scutellum flattened on disk, subtriangular, apex truncate, apical bristles placed on angles, long, cruciate, the subapical pair separated from apical by as far as distance between apical bristles. Legs strong, hind femora thickened somewhat; surfaces of all legs covered with hairs; apical spur of hind tibiæ very long, strong, and curved, in length reaching nearly to apex of metatarsus, its base at near apex of tibia. Wings with third costal division two-thirds as long as second; outer cross vein oblique.

Length, 2-3 mm.

Originally described from Cuba. There is a large series of specimens of both sexes in U. S. National Museum collections from Andros Key, Bahama Islands, West Indies, "on shells," June, 1912 (P. Bartsch); and one male from Havana, Cuba (E. A. Schwarz).

The male has the head a little smaller than the female, and has two very long hairs attached to the proboscis as shown in figure 21. In other respects they are similar.

#### PSEUDOHIPPELATES, new genus.

This genus differs from *Hippelates* in its much more elongated shape, the possession of frontal bristles, and the stronger bristling of the cheeks and anterior mouth margin. The hypopygium of the male is large and knoblike.

*Type of this genus.*—*Hippelates capax* Coquillett.

PSEUDOHIPPELATES CAPAX Coquillett.

Fig. 40.

*Hippelates capax* COQUILLET, Journ. N. J. Ent. Soc., vol. 6, 1898, p. 48.

*Male and female.*—Shiny black; disk of mesonotum distinctly obscured by yellowish gray pollinosity; frons black, anterior margin yellow, carried in the form of a short stripe backward to the apex of the triangle and separating the velvety black side spots which

extend well beyond apex of triangle; triangle shiny black, obscured by grayish pollen; face and cheeks yellow, the latter blackened on posterior margin, occiput black; antennæ black; palpi yellow; proboscis brown-black; upper mouth margin black. Abdomen yellowish ventrally, and on apices of abdominal segments. Legs yellow, blackened on upper surface of fore femora, apices of mid and hind femora, and whole of tibiæ and tarsi, except bases. Wings slightly browned, veins dark brown. Halteres yellow, all hairs and bristles on body and legs black.

Slender. Frons occupying one-half the width of head, the sides slightly divergent posteriorly; triangle equilateral, extending well toward eye margin at vertex and two-thirds of the length to anterior margin of frons; no hairs on margins of triangle, those on lateral margins of frons strong, the two on lower half bristlelike and pointing out over eye, the surface hairs absent on the pale center, except in front; antennæ above average size, third joint rounded, pubescent; arista swollen, and tapering, at base, as long as width of frons, pubescent; cheek slightly produced anteriorly, in height equal to about one-half the width of third antennal joint, marginal hairs distinct, the anterior one setulose; proboscis thick, apical portion bent back for a short distance; palpi normal. Mesonotum without punctures, the hairs short, in the lateral two rows single, in the center row double; pleuræ concolorous with disk of mesonotum; scutellum with posterior margin rounded, apical pair of bristles long, not closely approximated nor cruciate, besides these two long bristles there are two shorter marginal bristles and a few discal hairs. Legs rather slender, and elongated; hind tibial spur situated at apex and about equal in length to tibial diameter. Wings narrow, third costal division equal to two-thirds the length of second; third and fourth veins gradually, but slightly divergent; outer cross vein upright, last portion of fourth vein twice as long as penultimate portion; last portion of fifth vein three-fifths as long as penultimate portion of fourth.

Length, 2-3 mm.

Redescribed from type-specimen. Locality, Algonquin, Illinois.

Other specimens in collection as follows: One from Bascayne Bay, Florida; one with No. 265, no other data; and one from Frontera, Tabasco, Mexico, March 26, "light" (C. H. T. Townsend). The Mexican specimen is the smallest of the lot and rather immature, but I have not the least doubt as to its identity.

PSEUDOHIPPELATES GRACILIS, new species.

Figs. 26-28.

*Female*.—Black, shining. Frons black, opaque; anterior margin broadly yellow, the pale color carried back in center much as in



*capax*; triangle highly polished; antennæ yellow, third joint above, and arista black; face and cheeks pale yellow, the latter white dusted, proboscis black-brown, glossy; palpi yellow. Mesonotum with distinct brownish pollinosity; humeri glossy; pleuræ pollinose on above all coxæ, a broad stripe between fore and hind pairs glossy; scutellum colored as disk of mesonotum. Abdomen colored on dorsum as disk of mesonotum, yellowish below. Legs yellow; mid and hind coxæ brownish, apices of all femora browned; tibiæ browned, except at bases; all tarsi brown. Wings clear, veins dark brown. Halteres reddish yellow.

Frons about one-half the width of head; triangle elongate, occupying rather more than two-thirds the width of vertex, and extending slightly more than two-thirds to anterior margin of frons; surface hairs rather stronger than in *capax*, not numerous; lateral setulæ strong; antennæ above the average size; third joint disklike; artista very distinctly pubescent, length equal to width of frons, for profile see fig. 26. Mesonotum sparsely haired, the hairs rather setulose, and forming three short rows, the center one very short; scutellum with four marginal bristles and a few, weak, discal hairs, outline of scutellum rounded. Surface of abdomen with rather setulose hairs. Legs slender, elongate, hairy; hind tibial spur as in fig. 27. Wing is in fig. 28.

Length, 3–4 mm.

*Type*.—Cat. No. 15969, U.S.N.M.

*Type-locality*.—Canal Zone, Panama, April, 1907 (A. Busck), a large series of specimens.

The male differs from the female in having the pale color rather more pronounced, in having the cheeks not so high, and the proboscis smaller, as well as in its possession of a large knoblike hypopygium.

#### Genus CERATOBARYS Coquillett.

Figs. 31, 39.

*Ceratobarys* COQUILLET, Journ. N. J. Ent. Soc., vol. 6, 1898, p. 45.

There is but a single species belonging to this genus in North America so far as is known. It is very similar to certain yellow species in the genus *Crassiseta* but may be known from them at once by the possession of the hind tibial spur. From all the species in *Hippelates* and *Pseudohippelates* it may be known by the strap-shaped arista as shown in fig. 39.

I have seen specimens from Georgia; Plano, Texas, June, in oat field (E. S. Tucker); and College Station, Texas, from wheat, February, 1891 (F. M. Webster).

## SPECIES NOT INCLUDED IN TABLE.

## HIPPELATES GENALIS Thomson.

*Hippelates genalis* THOMSON, Eugen, Resa, Dipt., vol. 1, 1869, p. 608.—BECKER, Ann. Nat. Mus. Hung., vol. 10, 1912, p. 91.

Becker's description is:

Von rostroter Grundfarbe; Thoraxrücken und Schildchen matt dunkel braungrau, ersterer mit 3 feinen etwas eingedruckten Linien, kurz Schwarz behaart, letzteres am Rande gelb ohne längere Randborsten; Schulterbeulen gelbbraun; Brustseiten glanzend schwarzlich, fein hell pubeszent, Kopfgelb; Stirn rotgelb, gleichbreit, so breit wie ein Auge, mit kleinem glanzend braunen Scheiteldreieck, das am Schiitel nur die halbe Breite einnimmt und nur bis zur Stirnmitte reicht. Augen gross kreisrund, nackt. Fühler gelb drittes Glied schwarzbraun mit nackter Borste. Taster gelb, oberer innerer Mundrand geschwärzt. Russel lang dünne mit langen geknickten Saugflächen wie bei einer *Siphonella*. Backen gelb, sehr schmal, nicht breiter als das halbe breite Fühlerglied; Hinterkopf auf der Mitte verdunkelt. Hinterleib braun. Beine rotgelb; Hinter-Schenkel und Schienen auf der Mitte etwas gebräunt; Hinter-Schienen mit einem langen schwarzen gekrümmten Dorn, dessen Spitze bis zur Mitte des Metatarsus reicht und dessen Wurzel nicht am der Spitze, sondern schon etwas vor derselben beginnt. 2½ mm. lang. Aus Kalifornien. Type im Reichsmuseum Stockholm.

This species evidently comes close to *nobilis* Loew., but the frontal triangle in *genalis* is described as "glanzend," which is not the case in any of the species in the *plebejus* group. I have not seen the species, which may ultimately prove to be identical with *nobilis*.

## HIPPELATES LITURATUS Becker.

*Hippelates lituratus* BECKER, Ann. Mus. Nat. Hung., vol. 10, 1912, p. 87.

Becker gives the name *lituratus* in his table of species on page 87, but does not give any description of the species subsequently. The only characters given are those that may be deduced from the table as follows:

Thorax shining black; antennæ yellow, third joint partly black, arista shortly pubescent; legs mostly yellow, only the femora brown on middle; hind tibial spur before apex of tibia; abdomen yellow with brown bands on anterior margins of segments.

This description is not sufficient to identify the species which requires to be fully described to distinguish it from its allies.

## HIPPELATES LONGULUS Becker.

*Hippelates longulus* BECKER, Ann. Mus. Nat. Hung., vol. 10, 1912, p. 89.

Thoraxrücken und Schildchen glanzend Schwarz, jedoch mit sehr feinen brauner Pubeszenz, sehr fein und undeutlich reihenförmig behaart. Haare dunkel. Schulterbeulen und Brustseiten matt aschgrau bestäubt. Schwinger gelb. Kopfgelb. Hinterkopf Schwarz. Stirn matt dunkelrotbraun, an der vorderen Kante rotgelb. Scheiteldreieck glanzend schwarz, gleichseitig, nicht ganz bis zum Stirnvorderrande

reichend. Fuhler schwarz, dritte Glied gross mit stumpfer Oberecke, deutlich etwas pubeszent mit zarter deutlich behaarter Borste. Gesicht und Backen weissgelb, letztere nicht ganz so breit wie das dritte Fuhlerglied; Mundrand mit 2 deutlich feinen Borsten; Taster gelb, Russel dick mit etwas verlängerten Sauglappen und ganz schwarz. Hinterleib ziemlich matt, braun, am Bauche vorne gelb. Beine fast ganz schwarz braun, ausserste Kniespitzen der vordern Beine rostgelb; der Schienendorn steht dicht an der Spitze der Schiene und ist nicht besonders gross. Flügel schmal, deutlich etwas gebraunt mit dicken braunen Adern; dritte und vierte Längsadern schwach divergierend. 2. mm. lang. 1 Exemplar aus Kanada (Coll. Aldrich).

I have not seen this species, which is, in addition to the above description, distinguished in the synoptic table by the following characters:

Fühlerborsten deutlich behaart, drittes Fühlerglied gross, deutlich pubeszent; Gesicht und Backen weisslich. Thoraxrücken ausserordentlich fein punktiert und weitläufig schwarz behaart. Brustseiten matt aschgrau. Hinterleib matt Schwarzbraun. Biene schwarz-braun nur die aussersten Kniespitzen rostgelb. Flügel schmal braunlich.

The above description evidently proves this species to be distinct from any of those in my table.

## EXPLANATION OF PLATES.

## PLATE 23.

- Fig. 1. *Hippelates partitus*, head in profile.  
 2. *Hippelates partitus*, hind tibia.  
 3. *Hippelates flavipes*, head in profile.  
 4. *Hippelates flavipes*, hind tibia.  
 5. *Hippelates nudifrons*, hind tibia.  
 6. *Hippelates apicata*, hind femur and tibia.  
 7. *Hippelates truncata*, head in profile.  
 8. *Hippelates nudifrons*, head in profile.  
 9. *Hippelates truncata*, hind femur and tibia.  
 10. *Hippelates truncata*, scutellum.  
 11. *Hippelates texana*, scutellum.  
 12. *Hippelates nigricoxa*, hind tibia.  
 13. *Hippelates texana*, hind tibia.  
 14. *Hippelates nigricoxa*, head in profile.  
 15. *Hippelates plebejus*, hind tibia.  
 16. *Hippelates impressus*, hind tibia.  
 17. *Hippelates plebejus*, head in profile.  
 18. *Hippelates nobilis*, hind tibia.  
 19. *Hippelates stramineus*, apex of abdomen of female.  
 20. *Hippelates microcentrus* head in profile.

## PLATE 24.

21. *Prohippelates pallidus*, head in profile.  
 22. *Prohippelates pallidus*, scutellum.  
 23. *Prohippelates pallidus*, hind tibia.  
 24. *Prohippelates pallidus*, wing.  
 25. *Hippelates stramineus*, head in profile.  
 26. *Pseudohippelates gracilis*, head in profile.

- Fig. 27. *Pseudohippelates gracilis*, hind tibia.  
28. *Pseudohippelates gracilis*, wing.  
29. *Hippelates subaequalis*, head in profile.  
30. *Hippelates tener*, hind tibia.  
31. *Ceratobarys eulophus*, hind tibia.  
32. *Hippelates stramineus*, dorsum of thorax.  
33. *Hippelates dorsalis*, hind tibia.  
34. *Hippelates dorsalis*, head in profile.  
35. *Hippelates nitidifrons*, hind tibia.  
36. *Hippelates nitidifrons*, head in profile.  
37. *Hippelates subaequalis*, wing.  
38. *Hippelates nobilis*, scutellum.  
39. *Ceratobarys eulophus*, antenna.  
40. *Pseudohippelates capax*, head from above.